

COVID-19 Usage of Dräger Anesthesia Devices for Long-Term Ventilation

Draeger Medical Canada, Inc. – April 2020

Introduction

- This presentation is based on the letter, "COVID-19: Usage of Dräger Anesthesia Devices for Long-Term Ventilation" (Edition March 20, 2020). Please refer to the letter for a more complete understanding.
- The following instructions are provided only for a situation in which a COVID-19 patient requires long-term mechanical ventilation but the patient cannot be ventilated due to a lack of intensive care ventilators.
- The Dräger team is available to provide support in answering questions.
- This use of the anesthesia device is off-label use. The user recognizes that this is not the intended use of the device and does so pursuant to his own responsibility and at his own (liability) risk.

Check before using (1)



Check before using (2) A Resuscitator Bag MUST be Available

- The devices are designed to be tested every 24 hours to ensure readiness for operation. If the device test is not done, then the readiness of operation is not verified, and the flow measurement may become inaccurate.
- If it is not feasible to perform a system test every 24 hours due to clinical reasons, it is recommended to perform the test at least every 72 hours to reduce the likelihood of device malfunctions.
- To perform the system test, the patient must be disconnected from the anesthesia device and, during this period, sufficient ventilation of the patient (e.g., via the resuscitator) must be ensured. Be aware the test takes up to 8 minutes with the Perseus and up to 5 minutes with the Apollo and Fabius.
- The instructions for use states that a manual resuscitator must always be available with the device to enable back-up ventilation of the patient in case of problems or malfunctions.



Check before using (3) Hose connections

Before connecting a patient, the user must be able to check the proper ventilation hose connections



APL-valve

- The APL-valve has no influence in mechanical ventilation. It is only active in Man/Spon. In case of a ventilator failure Man/Spon becomes automatically active and the fresh gas flow will make the airway pressure rising up to the APLsetting.
- Carefully set the APL-valve in Man / Spon ventilation mode





« Spont » Position : the patient can breath spontaneously without resistance.



APL setting (here 20 mbar) for manual ventilation



Pop-up the APL-valve for releasing the pressure

Alarm volume should be set to MAXIMUM (100%)

- The alarm and safety concept of Dräger anesthesia is designed for the permanent presence of the user (MD/CRNA) within a distance of up to four meters. In situations during which a user is not within direct proximity of the device, it must be ensured that the alarm volume is set to maximum (100%).
- The alarm setting is located in the Configuration menu
- Below: Is an example from a Perseus A500

Adult	40 years 80 kg 175 cm	12-Sep-2018 9:59 Verdun	Central O2 supply low Filling level of vaporizer low Flow sensor calibration required		
Syster	System setup × 2				
Screen layout	Alarms	Therapy Im/E	ig. Options System System P		
				Overview	
Alarm I	Alarm limits for ventilation and gases for each patient category limits				
Alarm t	Alarm tone volume Alarm tone				
Offset	Offset for "Autoset limits" function Autoset limits				
Genera	General alarm behavior and alarm behavior in 'Pause' mode Alarm config. 1				
Behavi	Behavior of alarm limits when switching modes or in cardiac bypass mode Alarm config. 2				
Alarm I	Alarm limits for "Cylinder almost empty" Alarm config. 3				
				Flush	
				[₽] System setup	
				Tests	
				U Start	



Alarm Limits Settings

All alarm limits have to be set per patient and may have to be adapted over time to the changing clinical situations. It is particularly important that the alarm limits for the minute volume (lower and upper limit) and the expiratory CO2 (lower and upper limit) are able to generate alarms when hypo- or hyper-ventilation occurs.



Low Alarm Paw



Alarm History

Please be aware that in Dräger anesthesia devices, alarm notifications stop automatically when the alarm situation that ٠ caused the alarm is no longer valid.



Check periodically the alarm history / alarm log of the anesthesia device ٠

Routine checks

• Because the Dräger anesthesia devices are not designed for long time usage, the overall status of the device and its accessories have to be checked on a regular basis (at least each 12 hours, ideally more frequently). See details on the following slides.







CO₂ Absorber – Soda Lime

- Anesthesia ventilators are based on a rebreathing system and adjustable fresh gas flows. This requires the use of a CO2 absorber to prevent high CO2 levels in the circuit: never use the anesthesia device without absorber!
- It is important to examine the CO2 absorber and change it when it is exhausted. An exhausted absorber can be detected in two ways:





• The activation of an inspiratory CO2-high alarm limit helps to inform the user directly about an exhausted absorber

Water Trap

- The water trap at the gas measurement module of Dräger anesthesia devices protects the gas measurement module against humidity. To ensure system functionality the water trap has to be emptied or exchanged before it becomes full.
- For usage of the Dräger anesthesia device with high fresh gas flows and a combined HME-filter, the filling level must be checked every 12 hours (monitored on a frequent basis):

Water trap on the breathing circuit:

• Placing them at the lowest poit of

• Empting them when they are full.

the circuit.



Breathing Bag

- The breathing bag of Dräger anesthesia devices acts as a reservoir during mechanical ventilation. The exhaled breathing gas is captured in the breathing bag, therefore the breathing bag moves during mechanical ventilation. THIS IS NORMAL!
- The breathing bag should remain sufficiently inflated it must never collapse. If the breathing bag does in fact collapse, immediately check for leaks and increase the fresh gas flow.





Leakage Management



Disconnect All Vaporizers!!

In order to prevent the anesthetic agents from being used in a situation in which it might harm the patient or the environment of the patient, disconnect all vaporizers from the anesthesia device





No N_2O



Usage of Anesthesia Devices for Long-Term Ventilation (COVID-19 EXCEPTIONAL USE ONLY!)

Dräger anesthesia devices with an electronic gas mixer (Zeus IE, Perseus A500, Primus/Primus IE) a usage without N2O has to be configured in the system configuration. Example here with the Perseus A500



FGO₂ / FiO₂ Differences

- The oxygen concentration of the inhaled gas (measured as "FiO₂") may differ from the set oxygen concentration in the fresh gas as the result from mixing fresh gas with rebreathed gas of the patient.
- Special attention must be given to the FiO₂ values and the FiO₂ low alarm.
- The difference in between fresh gas oxygen concentration and FiO2 values can be reduced to a minimum by increasing the fresh gas flow to at least 150% of the minute volume.



Setting Fresh Gas Flow

A high fresh gas flow of at least 150% of the minute volume helps to decrease excessive condensation in the breathing system as well as at the filter at the inspiratory port.



Breathing System Heating (when available)

If the heating is not activated:

- 1. Opening the « System setup » box
- 2. Choosing « Therapy » (A)
- 3. Set/confirm the heating « ON » (B)



Infection Prevention Passive Humidification

- Only mechanical filters are suitable in long-term ventilation
- Use of a combined element: Heat and Moisture Exchanger (HME) / mechanical breathing system filter (e.g., Dräger TwinStar HEPA) only at the patient connector (Y-piece).
- For more information, please read the Dräger letter "SARS-CoV-2 and Handling of Dräger Anesthesia Workstations".



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Prefered solution

Active Humidification

The usage of active humidification is not approved with Dräger anesthesia devices and is considered off-label use. Its use is done at the discretion and risk of the user.

Should an active humidifier nevertheless be used in this exceptional situation:

- Breathing circuits MUST have a water trap in the expiratory limb
- Dual heated breathing circuits **MUST NOT** be used with Dräger anesthesia devices.
- A filter <u>must be used on the inspiratory port</u> of the anesthesia device. Remember, only mechanic filters shall be used.
- For more information, please read the Dräger letter "SARS-CoV-2 and Handling of Dräger Anesthesia Workstations."



Additional Warnings!

- Modes that are not known by the user (e.g., Ext. Fresh Gas Outlet, or Pause) must not be used.
- Modes, settings, and measured values that are common on ICU ventilators might not be available or labeled the same in the anesthesia devices (such as high flow therapy or Insp hold)
- Nebulization of drugs or aerosol therapy are <u>not approved</u> with anesthesia devices. If aerosol or other drugs are given to the airways, this may cause malfunctions, such as incorrect measurement of the gas analyzer.

Attachment 1 Comments to particular modes of operation (1/2)

In Dräger anesthesia devices, the alarm limit is only used for generating the alarm, but does not limit the pressure. For the pressure limitation, the setting "Pmax" is used, which also has to be set specific to the patient and the clinical situation.





When it is possible, the medium alarm priority is recommended, especially in longterm ventilation in which the user might not be permanently in front of the device

Attachment 1 Comments to particular modes of operation (2/2)

- Dräger anesthesia devices do not offer a dedicated NIV-mode. Therefore, the user has to pay particular attention to leakages when doing mask ventilation
- Dräger anesthesia devices do not offer Nasal High Flow Therapy
- Sedation with volatile agents: If the long-term ventilation is combined with a sedation of the patient with anesthetic agents, the direct environment of the patient has to be protected against surplus of anesthetic agent. Typically in the operating theatre, an active scavenging takes care that the surplus of fresh gas is evacuated. In environments of use without an active scavenging, an ejector may protect the direct environment of the patient against increased concentrations of anesthetic agents (even the smallest concentrations of anesthetic agent may trigger malign hyperthermia). Also, in the Fabius, Primus/Primus IE and Zeus IE deviecs, the usage of activated charcoal filters might be an alternative. Please check your respective regulations, e.g. employment protection requirements.

Support

If you have any questions or comments, please do not hesitate to contact your local Dräger representative.

Please visit the Dräger COVID-19 website <u>https://www.draeger.com/en_corp/Corporate/Coronavirus-COVID-19</u> for updates and other useful information.



Thank you

Draeger Medical Canada, Inc.

2425 Slymark Avenue Mississauga, ON, L4W 4Y6